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HAEMATOLOGY

Complete Blood Count With - ESR

Investigation	Observed Value	Unit	Biological Reference Interval
Haemoglobin (EDTA Blood/*Spectrophotometry*)	**13.1**	g/dL	13.5 - 18.0
Packed Cell Volume(PCV)/Haematocrit (EDTA Blood/*Derived from Impedance*)	**40.8**	%	42 - 52
RBC Count (EDTA Blood/*Impedance Variation*)	**4.44**	mill/cu.mm	4.7 - 6.0
Mean Corpuscular Volume(MCV) (EDTA Blood/*Derived from Impedance*)	92.0	fL	78 - 100
Mean Corpuscular Haemoglobin(MCH) (EDTA Blood/*Derived from Impedance*)	29.5	pg	27 - 32
Mean Corpuscular Haemoglobin concentration(MCHC) (EDTA Blood/*Derived from Impedance*)	32.1	g/dL	32 - 36
RDW-CV (EDTA Blood/*Derived from Impedance*)	**17.1**	%	11.5 - 16.0
RDW-SD (EDTA Blood/*Derived from Impedance*)	**55.06**	fL	39 - 46
Total Leukocyte Count (TC) (EDTA Blood/*Impedance Variation*)	6700	cells/cu.mm	4000 - 11000
Neutrophils (EDTA Blood/*Impedance Variation & Flow Cytometry*)	61.3	%	40 - 75
Lymphocytes (EDTA Blood/*Impedance Variation & Flow Cytometry*)	22.8	%	20 - 45

Dr RAVIKUMAR R
MBBS, MD BIOCHEMISTRY
CONSULTANT BIOCHEMIST
Reg No : 78771

VERIFIED BY

DR SHAMIM JAVED
MD PATHOLOGY
KMC 88902

APPROVED BY

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Investigation	Observed Value	Unit	Biological Reference Interval
Eosinophils (EDTA Blood/*Impedance Variation & Flow Cytometry)*	3.4	%	01 - 06
Monocytes (EDTA Blood/*Impedance Variation & Flow Cytometry)*	**11.9**	%	01 - 10
Basophils (Blood/*Impedance Variation & Flow Cytometry)*	0.6	%	00 - 02
Absolute Neutrophil count (EDTA Blood/*Impedance Variation & Flow Cytometry)*	4.11	10^3 / µl	1.5 - 6.6
Absolute Lymphocyte Count (EDTA Blood/*Impedance Variation & Flow Cytometry)*	1.53	10^3 / µl	1.5 - 3.5
Absolute Eosinophil Count (AEC) (EDTA Blood/*Impedance Variation & Flow Cytometry)*	0.23	10^3 / µl	0.04 - 0.44
Absolute Monocyte Count (EDTA Blood/*Impedance Variation & Flow Cytometry)*	0.80	10^3 / µl	< 1.0
Absolute Basophil count (EDTA Blood/*Impedance Variation & Flow Cytometry)*	0.04	10^3 / µl	< 0.2
Platelet Count (EDTA Blood/*Impedance Variation)*	282	10^3 / µl	150 - 450
MPV (EDTA Blood/*Derived from Impedance)*	8.3	fL	7.9 - 13.7
PCT (EDTA Blood/*Automated Blood cell Counter)*	0.23	%	0.18 - 0.28
ESR (Erythrocyte Sedimentation Rate) (Citrated Blood/*Modified Westergren)*	5	mm/hr	< 15

Dr RAVIKUMAR R
MBBS, MD BIOCHEMISTRY
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Investigation	Observed Value	Unit	Biological Reference Interval
BIOCHEMISTRY			
Liver Function Test			
Bilirubin(Total) (Serum/*Diazotized Sulfanilic Acid)*	0.5	mg/dL	0.1 - 1.2
Bilirubin(Direct) (Serum/*Diazotized Sulfanilic Acid)*	0.2	mg/dL	0.0 - 0.3
Bilirubin(Indirect) (Serum/*Derived)*	0.3	mg/dL	0.1 - 1.0
Total Protein (Serum/*Biuret)*	8.0	gm/dL	6.0 - 8.0
Albumin (Serum/*Bromocresol green)*	4.6	gm/dL	3.5 - 5.2
Globulin (Serum/*Derived)*	3.4	gm/dL	2.3 - 3.6
A : G Ratio (Serum/*Derived)*	1.4		1.1 - 2.2
SGOT/AST (Aspartate Aminotransferase) (Serum/*IFCC Kinetic)*	15	U/L	5 - 40
SGPT/ALT (Alanine Aminotransferase) (Serum/*IFCC / Kinetic)*	16	U/L	5 - 41
Alkaline Phosphatase (SAP) (Serum/*IFCC Kinetic)*	111	U/L	53 - 128
GGT(Gamma Glutamyl Transpeptidase) (Serum/*SZASZ standarised IFCC)*	17	U/L	< 55

Dr.Arjun C.P
MBBS,MD Pathology
Reg No:KMC 89655

VERIFIED BY

DR SHAMIM JAVED
MD PATHOLOGY
KMC 88902

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Investigation	Observed Value	Unit	Biological Reference Interval
Lipid Profile			
Cholesterol Total (Serum/*Cholesterol oxidase/Peroxidase)*	133	mg/dL	Optimal: < 200 Borderline: 200 - 239 High Risk: >= 240
Triglycerides (Serum/*Glycerol phosphate oxidase / peroxidase)*	111	mg/dL	Optimal: < 150 Borderline: 150 - 199 High: 200 - 499 Very High: >= 500

INTERPRETATION: The reference ranges are based on fasting condition. Triglyceride levels change drastically in response to food, increasing as much as 5 to 10 times the fasting levels, just a few hours after eating. Fasting triglyceride levels show considerable diurnal variation too. There is evidence recommending triglycerides estimation in non-fasting condition for evaluating the risk of heart disease and screening for metabolic syndrome, as non-fasting sample is more representative of the ñusualò circulating level of triglycerides during most part of the day.

HDL Cholesterol (Serum/*Immunoinhibition)*	**30**	mg/dL	Optimal(Negative Risk Factor): >= 60 Borderline: 40 - 59 High Risk: < 40
LDL Cholesterol (Serum/*Calculated)*	80.8	mg/dL	Optimal: < 100 Above Optimal: 100 - 129 Borderline: 130 - 159 High: 160 - 189 Very High: >= 190
VLDL Cholesterol (Serum/*Calculated)*	22.2	mg/dL	< 30
Non HDL Cholesterol (Serum/*Calculated)*	103.0	mg/dL	Optimal: < 130 Above Optimal: 130 - 159 Borderline High: 160 - 189 High: 190 - 219 Very High: >= 220

Dr.Arjun C.P
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Reg No:KMC 89655

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Investigation	Observed Value	Unit	Biological Reference Interval
INTERPRETATION: 1.Non-HDL Cholesterol is now proven to be a better cardiovascular risk marker than LDL Cholesterol. 2.It is the sum of all potentially atherogenic proteins including LDL, IDL, VLDL and chylomicrons and it is the "new bad cholesterol" and is a co-primary target for cholesterol lowering therapy.			
Total Cholesterol/HDL Cholesterol Ratio (Serum/*Calculated)*	4.4		Optimal: < 3.3 Low Risk: 3.4 - 4.4 Average Risk: 4.5 - 7.1 Moderate Risk: 7.2 - 11.0 High Risk: > 11.0
Triglyceride/HDL Cholesterol Ratio (TG/HDL) (Serum/*Calculated)*	3.7		Optimal: < 2.5 Mild to moderate risk: 2.5 - 5.0 High Risk: > 5.0
LDL/HDL Cholesterol Ratio (Serum/*Calculated)*	2.7		Optimal: 0.5 - 3.0 Borderline: 3.1 - 6.0 High Risk: > 6.0

Dr.Arjun C.P
MBBS,MD Pathology
Reg No:KMC 89655

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Investigation	Observed Value	Unit	Biological Reference Interval
Glycosylated Haemoglobin (HbA1c)			
HbA1C (Whole Blood/*HPLC)*	**7.7**	%	Normal: 4.5 - 5.6 Prediabetes: 5.7 - 6.4 Diabetic: >= 6.5

INTERPRETATION: If Diabetes - Good control : 6.1 - 7.0 % , Fair control : 7.1 - 8.0 % , Poor control >= 8.1 %

Estimated Average Glucose (Whole Blood*)*	174.29	mg/dL	

INTERPRETATION: Comments

HbA1c provides an index of Average Blood Glucose levels over the past 8 - 12 weeks and is a much better indicator of long term glycemic control as compared to blood and urinary glucose determinations.

Conditions that prolong RBC life span like Iron deficiency anemia, Vitamin B12 & Folate deficiency, hypertriglyceridemia,hyperbilirubinemia,Drugs, Alcohol, Lead Poisoning, Asplenia can give falsely elevated HbA1C values.

Conditions that shorten RBC survival like acute or chronic blood loss, hemolytic anemia, Hemoglobinopathies, Splenomegaly,Vitamin E ingestion, Pregnancy, End stage Renal disease can cause falsely low HbA1c.

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Investigation	Observed Value	Unit	Biological Reference Interval

IMMUNOASSAY

THYROID PROFILE / TFT

T3 (Triiodothyronine) - Total (Serum/*CMIA)*	1.28	ng/mL	0.7 - 2.04

INTERPRETATION:
Comment :
Total T3 variation can be seen in other condition like pregnancy, drugs, nephrosis etc. In such cases, Free T3 is recommended as it is Metabolically active.

T4 (Thyroxine) - Total (Serum/*CMIA)*	9.04	µg/dL	4.2 - 12.0

INTERPRETATION:
Comment :
Total T4 variation can be seen in other condition like pregnancy, drugs, nephrosis etc. In such cases, Free T4 is recommended as it is Metabolically active.

TSH (Thyroid Stimulating Hormone) (Serum/*Chemiluminescent Microparticle Immunoassay(CMIA))*	3.44	µIU/mL	0.35 - 5.50

INTERPRETATION:
Reference range for cord blood - upto 20
1 st trimester: 0.1-2.5
2 nd trimester 0.2-3.0
3 rd trimester : 0.3-3.0
(Indian Thyroid Society Guidelines)
Comment :
1.TSH reference range during pregnancy depends on Iodine intake, TPO status, Serum HCG concentration, race, Ethnicity and BMI.
2.TSH Levels are subject to circadian variation, reaching peak levels between 2-4am and at a minimum between 6-10PM.The variation can be of the order of 50%,hence time of the day has influence on the measured serum TSH concentrations.
3.Values&amplt;0.03 µIU/mL need to be clinically correlated due to presence of rare TSH variant in some individuals.

DR SHAMIM JAVED
MD PATHOLOGY
KMC 88902

APPROVED BY

Investigation	Observed Value	Unit	Biological Reference Interval
CLINICAL PATHOLOGY			
PHYSICAL EXAMINATION			
Colour (Urine)	Pale Yellow		
Appearance (Urine)	Clear		Clear
Volume (Urine)	20	mL	
CHEMICAL EXAMINATION(Automated-Urineanalyser)			
pH (Urine/*AUTOMATED URINANALYSER)*	6.0		4.5 - 8.0
Specific Gravity (Urine)	1.025		1.002 - 1.035
Ketones (Urine)	Negative		Negative
Urobilinogen (Urine/*AUTOMATED URINANALYSER)*	0.2		0.2 - 1.0
Blood (Urine/*AUTOMATED URINANALYSER)*	Negative		Negative
Nitrite (Urine/*AUTOMATED URINANALYSER)*	Negative		Negative
Bilirubin (Urine/*AUTOMATED URINANALYSER)*	Negative		Negative
Protein (Urine)	Negative		Negative

Dr.ROHINI KUMAR Ph.D,
Consultant Microbiologist

VERIFIED BY

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MD PATHOLOGY
KMC 88902

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Investigation	Observed Value	Unit	Biological Reference Interval
Glucose (Urine)	+		Negative
Leukocytes (Urine)	Negative	leuco/uL	Negative
MICROSCOPY(URINE DEPOSITS)			
Pus Cells (Urine/*Flow cytometry*)	2-3	/hpf	3-5
Epithelial Cells (Urine)	1-2	/hpf	1-2
RBCs (Urine/*Flow cytometry*)	Nil	/hpf	NIL
Others (Urine)	Nil		Nil
Casts (Urine/*Flow cytometry*)	Nil	/hpf	0 - 1
Crystals (Urine)	Nil		NIL

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Investigation	Observed Value	Unit	Biological Reference Interval
IMMUNOHAEMATOLOGY			
BLOOD GROUPING AND Rh TYPING (EDTA Blood/*Agglutination)*	'B' 'Positive'		

Dr SURAJ JAIN
Consultant Pathologist
Reg No : 80423

VERIFIED BY

DR SHAMIM JAVED
MD PATHOLOGY
KMC 88902

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Investigation	Observed Value	Unit	Biological Reference Interval
BIOCHEMISTRY			
BUN / Creatinine Ratio	10		6 - 22
Glucose Fasting (FBS) (Plasma - F/*GOD - POD)*	**107**	mg/dL	Normal: < 100 Pre Diabetic: 100 - 125 Diabetic: >= 126

INTERPRETATION: Factors such as type, quantity and time of food intake, Physical activity, Psychological stress, and drugs can influence blood glucose level.

Glucose Fasting - Urine (Urine - F*)*	+		Negative
Glucose Postprandial (PPBS) (Plasma - PP/*GOD - POD)*	**233**	mg/dL	70 - 140

INTERPRETATION:
Factors such as type, quantity and time of food intake, Physical activity, Psychological stress, and drugs can influence blood glucose level. Fasting blood glucose level may be higher than Postprandial glucose, because of physiological surge in Postprandial Insulin secretion, Insulin resistance, Exercise or Stress, Dawn Phenomenon, Somogyi Phenomenon, Anti- diabetic medication during treatment for Diabetes.

Blood Urea Nitrogen (BUN) (Serum/*Urease-GLDH)*	9	mg/dL	7.0 - 21
Creatinine (Serum/*Jaffe Kinetic)*	0.9	mg/dL	0.9 - 1.3

INTERPRETATION: Elevated Creatinine values are encountered in increased muscle mass, severe dehydration, Pre-eclampsia, increased ingestion of cooked meat, consuming Protein/ Creatine supplements, Diabetic Ketoacidosis, prolonged fasting, renal dysfunction and drugs such as cefoxitin ,cefazolin, ACE inhibitors ,angiotensin II receptor antagonists,N-acetylcyteine , chemotherapeutic agent such as flucytosine etc.

Uric Acid (Serum/*Uricase/Peroxidase)*	5.0	mg/dL	3.5 - 7.2

Dr.Arjun C.P
MBBS,MD Pathology
Reg No:KMC 89655

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Investigation	Observed Value	Unit	Biological Reference Interval
IMMUNOASSAY			
Prostate specific antigen - Total(PSA) (Serum/*Chemiluminescent Microparticle Immunoassay(CMIA))*	0.786	ng/mL	Normal: 0.0 - 4.0 Inflammatory & Non Malignant conditions of Prostate & genitourinary system: 4.01 - 10.0 Suspicious of Malignant disease of Prostate: > 10.0

INTERPRETATION: Analytical sensitivity: 0.008 - 100 ng/mL
PSA is a tumor marker for screening of prostate cancer. Increased levels of PSA are associated with prostate cancer and benign conditions like bacterial infection, inflammation of prostate gland and benign hypertrophy of prostate/ benign prostatic hyperplasia (BPH).
Transient elevation of PSA levels are seen following digital rectal examination, rigorous physical activity like bicycle riding, ejaculation within 24 hours.
PSA levels tend to increase in all men as they age.
Clinical Utility of PSA:
- In the early detection of Prostate cancer.
- As an aid in discriminating between Prostate cancer and Benign Prostatic disease.
- To detect cancer recurrence or disease progression.

DR SHAMIM JAVED
MD PATHOLOGY
KMC 88902

APPROVED BY

-- End of Report --